local systems for fulfilling one of the great aims of the guild, viz., organising the training of the youth of the country for industries and citizenship.

We hope that Lord Haldane will add the influence of his personal prestige to the authority of the president of the British Science Guild, so that the need of developing a *higher quality* of technical education in this country may be impressed upon local administrators and the general public. No better text for a discourse upon this theme need be sought than the sentence quoted so appropriately in the annual report from one of the last public utterances of King Edward VII.:—

> As time goes on, I feel more and more convinced that the prosperity, even the very safety and existence, of our country depend on the quality of the scientific and technical training of those who are to guide and control our industries.

G. F. D.

The following gentlemen were elected as vice-presidents of the Guild at the annual meeting:—the American Ambassador, Sir Thomas Barlow, K.C.V.O., F.R.S., Sir Lauder Brunton, Bart., F.R.S., Sir Ernest Shackleton, C.V.O., and Major O'Meara, R.E., C.M.G.

The membership of the Guild, including the Canadian Branch, has increased from 793 at the end of 1907 to 872 at the end of 1910; of these, 28 are life fellows, 58 fellows subscribing annually, and 425 life members. In addition to these, there are 7 members belonging to the Australian Branch, of whom 5 are life members.

The following were elected to form the executive committee for 1911–12; the names of new members are printed in italics:—*President*, Rt. Hon. Viscount Haldane, K.C., F.R.S.; *hon. treasurer*, Rt. Hon. Lord Avebury, P.C., F.R.S.; *hon. assist. treasurer*, Lady Lockyer; *vice-presidents, Sir Thomas Barlow, K.C.V.O., F.R.S.*, Sir David Gill, K.C.B., F.R.S.; *chairman of committees*, Sir Norman Lockyer, K.C.B., F.R.S.; *vice-chairmen of committees*, Sir Hugh Bell, Bart., Hon. Sir John Cockburn, K.C.M.G., Prof. Meldola, F.R.S., Sir William Ramsay, K.C.B., F.R.S., Mr. F. Verney; *other members, Mr. Wm. Phipson Beale, K.C., M.P.*, Dr. G. T. Beilby, F.R.S., Dr. Bovey, F.R.S., Sir Edward Brabrook, C.B., *Mr. Harold Cox, Prof. Farmer, F.R.S., Sir Luke Fildes, R.A.*, Surgeon-General Sir A. Keogh, K.C.B., Prof. A. Liversidge, F.R.S., Mr. A. Mosely, C.M.G., Mr. C. Freeman Murray, Prof. J. Perry, F.R.S., Sir Boverton Redwood, Mrs. W. N. Shaw, Mr. Carmichael Thomas, Dr. A. D. Waller, F.R.S., Colonel Sir John Young, C.V.O.; *hon. secretaries*, Sir Alex. Pedler, C.I.E., F.R.S., Dr. F. Mollwo Perkin.

NOTES.

Dr. L. A. Bauer, director of the Department Terrestrial Magnetism of the Carnegie Institution of Washington, sailed from Vancouver, B.C., on March 24 on a trip of inspection of the non-magnetic yacht *Carnegie* at Colombo, Ceylon, where she is due to arrive some time in June next. *En route* Dr. Bauer will call at the magnetic observatories at Melbourne and Christchurch.

We regret to see the announcement, in *The Times*, of the death of Mr. Charles du Bois Larbalestier, a leading authority on lichens, to whom the last edition of Leighton's "Lichen Flora" was dedicated; and also of Mr. J. S. Slater, for many years principal of the Civil Engineering College, Sibpur, near Calcutta.

The following have been elected by H.H. the Prince of Monaco the members of the first council of the new Institute of Human Palæontology in Paris:—MM. Salomon Reinach, Boule, Verneau, Cartailhac, Capitan, Villeneuve, for France; Sir Ray Lankester for the British Isles; Prof. von Luschan for Germany; Prof. Hoernes for Austria-Hungary; Prof. Issel for Italy, and Prof. G. Retzius for the Scandinavian countries.

Dr. S. F. Emmons, an American geologist of distinction, died at Washington on March 28. He was born in Boston in 1841, and, after graduating at Harvard, studied at the Schools of Mines in Paris and Freiberg. He had been connected with the U.S. Geological Survey since 1867, and was a prolific author of geological publications, especially reports on explorations in the Rocky Mountains and Colorado.

Dr. D. Mawson, whose paper on the Australasian Antarctic Expedition, read before the Royal Geographical Society on Monday, appears elsewhere in this issue, announced to the society, towards the close of his address, that the Commonwealth Parliament will probably be asked by the Government to vote a sum of 20,000*l.* towards the expenses of the expedition. The council of the Royal Geographical Society has decided to contribute the sum of 500*l.* to the expedition.

Dr. J. S. Flett has been appointed to succeed Dr. J. Horne, F.R.S., as assistant in Scotland to the director of the Geological Survey. Dr. Flett is a graduate of Edinburgh University, where he was Baxter Scholar, Falconer Fellow in Geology, and a Heriot Research Fellow. He was for four years lecturer on petrology in the University, and in 1901 joined the Geological Survey. In 1903 he was appointed petrographer to the Survey. After the West Indian eruptions in 1901, he was sent out with Dr. Tempest Anderson by the Royal Society of London to report on the volcanic phenomena. He has published many scientific papers dealing principally with the volcanic and metamorphic rocks of the British Isles, and he has contributed largely to the memoirs of the Geological Survey, not only on Scotland, but also on Cornwall and Devon. For scientific research he was awarded the Neill medal by the Royal Society of Edinburgh (1902) and the Bigsby medal by the Geological Society of London (1909).

The Walker prize of the Royal College of Surgeons, founded to encourage investigation into the pathology and therapeutics of cancer, has been awarded to Dr. E. F. Bashford, general superintendent and director of the laboratory of the Imperial Cancer Research Fund of London. The value of the prize is 100*l.* The Cartwright prize, consisting of the Cartwright medal and 70*l.*, has been awarded to Mr. H. P. Pickerill, professor of dentistry and director of the dental school at the University of Otago, New Zealand, for his essay on "The Prevention of Dental Caries." The Jacksonian prize has been awarded to Mr. K. Macfarlane Walker, of St. Bartholomew's Hospital, for his essay on "Tuberculous Disease of the Urinary Bladder and Male Genital Organs."

All the necessary arrangements have now been made by the General Post Office and the postal authorities abroad for a prolonged series of long-distance tests over the new submarine telephone cable which, as already stated in these columns, has been laid between Dover and Cap Grisnez. The tests will take place between various provincial towns in England and towns in Holland, Germany, and Switzerland, and it is expected that our foreign telephone service will be very greatly extended in consequence. No public service, however, will be offered until 90 per cent. of the test calls have proved successful. When this fact has been ascertained, there is no reason why, under ordinary conditions, speech over the line should not be quite distinct. There must, however, always be the chance that gales and blizzards may cause interruptions on the land lines, as these in most cases are still carried overhead.

On Wednesday, April 5, a very interesting exhibition was held at the Natural History Museum, South Kensington, when all the subscribers to the British Ornithologists' Union Expedition to Dutch New Guinea were invited to inspect the first collections of mammals and birds. The expedition is still attempting to reach the Snow Mountains, but it will be remembered that two members of the party, Mr. W. Goodfellow, the leader, and Mr. G. C. Shortridge, have been invalided home. The latter brought with him a large zoological collection, including about 1100 birds and 100 mammals. These have now been examined, and though procured at a comparatively low elevation (none having been obtained above 21,000 feet), the birds especially are of the greatest value and rarity. Quite a number were hitherto unrepresented in the national collection, while some five or six appear to be new to science. One of the most notable acquisitions is a magnificent bird of paradise (*Xanthomelus ardens*), which is yellow, with an orange-scarlet head and tippet. A small series of this fine bird was sent home, including adults of both sexes and a male in immature plumage. Among the novelties we may specially mention two brilliantly coloured parrots belonging to the genera Cyclopsittacus and Aprosmictus, likewise a beautiful fruit-pigeon of the genus Ptilopus. The collections were much admired, especially the many brilliantly coloured species to be found among the birds of paradise, parrots, kingfishers, rollers, pittas, &c. The mammals, though less showy, were also of great interest, while the drawings by Mr. Shortridge of bows and arrows, stone axes and clubs, paddles, &c., were much admired. The ethnological collection has not yet arrived, but is sure to prove of special interest.

It has been commonly taken for granted that a convenient and effectual way of encouraging scientific research is by the foundation and endowment of prizes for investigations dealing with specified subjects. The results published in the *Rendiconti* of the Lombardy Institution, xliv. (2), 1, recently received, seem to indicate that such endowments not infrequently fail to accomplish the desired object. The institution offered seven prizes for scientific subjects, one medal for industry, one for agriculture, a prize for commercial success, and others for economical, philosophical, literary, and forensic subjects. The industrial medal was awarded to one of three competitors, and for the Brambilla commercial prize eighteen firms competed, nine of which received awards and medals; but only two awards were made for work in science, and none in agriculture. These results are the more remarkable in view of the subjects on which dissertations were presented. The competitors for the agricultural medal seem to have introduced substantial improvements in cheese-making, based on a scientific study of bacteriology, but were apparently disqualified because their process had not met with such universal adoption that further recognition was unnecessary. The prize founded for the cure of pellagra seems to have been unawarded, in spite of researches of considerable scientific value having been made in connection with this disease. But the most remarkable fact is that a prize offered for improvements in dirigible balloons has now remained unawarded for three consecutive years. At a time when aërial navigation has made its greatest progress, it should surely have been possible to find many Italian aviators or aëronauts worthy of a prize founded long before the days of aviation.

An exceptionally long spell of easterly and northerly winds has prevailed over the whole of the British Islands, continuing for four weeks with the exception of a break or two lasting only for a few hours, and there have only been four days to April 11 at Greenwich since March 4 with the temperature in excess of the average. The day temperatures were low in March, but the nights were often fairly warm, with the result that the mean temperature for the month was in good agreement with the average. Since April set in, the cold has intensified, and the day temperatures have been remarkably low for the time of year. At Greenwich the maximum shade temperature on April 5 was 36·1°, and on April 6 38·0°. The observations at Greenwich since 1841 only show one day with the maximum temperature below 40°, a reading of 36·3° being recorded on April 19, 1849. The lowest minimum temperature at Greenwich during the recent cold spell was 26·7° on April 6; this is not remarkably low and has been occasionally equalled of recent years. The mean temperature for the week ending April 8 was 37·9°, and apparently the Greenwich observations only yield one period of seven days in April with so low a temperature since 1841, the mean for the week ending April 10, 1888, being 36·4°. The mean of the maximum or day readings for the week ending April 8 this year is 43·1°, whilst for the specially cold week ending April 10, 1888, it was 44·1°, so that the recent cold spell is the coldest on record for April so far as the maximum temperatures are concerned. The summary of the weather for the week ending April 8 this year, just issued by the Meteorological Office, shows that the mean temperature for the period was much below the average over the whole of the British Islands. The coldest district was the south-east of England, where the mean for the week was 36·9°, which is 8·3° below the average of the past twenty-five years. The deficit amounted to nearly 7° in the east and south-west of England and in the Channel Islands, and to 6·4° in the Midland counties. During the middle of the week the thermometer remained abnormally low over the eastern and southern counties of England, barely exceeding 32° at a few places, and at Tunbridge Wells on April 5 the highest temperature was 31°. The lowest minima, recorded on April 5 or 6, ranged from 17° in the east of Scotland and 20° in the west of Scotland, to 26° in the north-east and north-west of England. Snow was of frequent occurrence in nearly all parts of the kingdom.

In *Man* for April Mr. W. L. H. Duckworth describes a skull of the second Neolithic period found in a mound at Tsangli in Thessaly, and now deposited in the Cambridge Museum. In form it is mesaticephalic, and a deep incesura subincutalis reduces the height of the mandible in front. This last character is almost the only distinctive feature of the specimen. If, as may be inferred from its association with objects of undoubted antiquity, this specimen is of ancient date, it proves the existence of a highly evolved type of cranial form in Thessaly at this early period, modern examples indicating that the more usual form of skull in this part of Greece is longer and narrower than at the earlier period.

Mr. H. St. George Gray, in his report of the third season's work at the Maumbury Rings, records some additional discoveries. The remains now disinterred include two skeletons of the Romano-British period, with two of later date. We have as yet no certain knowledge of the age of the surrounding embankment, which cannot be fixed without further excavation. Socket-holes indicate the position of the railing erected for the protection of the spectators, and at the bottom of the arena some most interesting ceramic remains were unearthed, establishing the fact that the shafts date from the Neolithic period. The pottery consists of pieces of a rude vessel, black in colour, with a dull red-brick tinge on the exterior only. It was imperfectly fired, and was composed of flint, quartz, and bone, but without any trace of chalk, calcite, or any form of limestone.

Among the pressing wants for the study of the evolution of human culture in these islands is the establishment of a folk-museum to contain the numerous archaic implements and utensils still to be found in the more secluded parts of the country, but which are now rapidly disappearing. The Pitt Rivers Museum at Oxford does something to fill this gap in our collections, and if its accommodation and resources could be increased, the work of forming and arranging such a collection could not be placed in better hands than those of its present curator, Mr. H. Balfour. Mr. J. Edge-Partington, in the April number of *Man*, illustrates the abundance of such material by describing, with drawings, a series of such primitive domestic implements and vessels collected from farmhouses in North Wales, where they are rapidly disappearing from use. Many of these are of a very primitive type, such as the collar used to control rams in the rutting season, curious spades and knives, a dish used for the dipping of rush lights, and a grooved rolling-pin for making oat cakes.

The Bio-Chemical Journal for March (vol. v., Nos. 8 and 9) contains a memorial notice of Dr. Christian A. Herter, of New York, who recently died at the early age of forty-five. His greatest work was his study of the complex elusive diseases set up by the development of an abnormal bacterial flora in the intestinal canal.

A chart containing the essential features required for the description and identification of bacterial species has been issued by a committee of the Society of American Bacteriologists, consisting of Messrs. Chester, Gorham, and Erwin Smith. The chart is a most comprehensive one, and includes a glossary of terms; it deserves the serious consideration of all bacteriologists.

No. 39 of the Scientific Memoirs of the Government of India is by Lieut.-Colonel Sutherland, and discusses in much detail the applicability to medico-legal practice in India of the biochemical tests for the origin of blood stains. As regards the precipitin test, the age of the blood stain, at least up to twenty-seven months, makes no difference in the applicability of the test.

The report of Dr. Bashford, the delegate of his Majesty's Government to the second International Conference on Cancer Research, held at Paris in October last, has recently been issued. Among other subjects he directs attention to a paper dealing with certain tumours occurring in the sugar-beet and allied plants. These tumours can be grafted on to other healthy plants, and no causative parasite can be detected in them. From their general biological behaviour it appears justifiable to assign to them in the vegetable kingdom a position analogous to that occupied by cancer in the animal kingdom.

The fatality of fractures of the leg and of lobar pneumonia as deduced from hospital mortality rates, 1751–1901, is the subject of a statistical study by Messrs. Greenwood, jun., and Candy (Journ. Roy. Statistical Soc., lxxiv., part iv., 1911). It seems that the fatality of lobar or ordinary pneumonia has changed little during the last fifty years, the fatality of compound fractures of the leg has steadily diminished down to the present time, and the fatality of simple fractures of the leg diminished greatly and steadily down to fifty years ago, but since then the change has not been regular. The curious point is brought out that cases of simple fracture in the old days were kept in hospital often for months, and sometimes for much longer, and the patients frequently developed bedsores and an unhealthy condition, which resulted in death.

In a recent short paper (*Parasitology*, vol. iii., No. 3, 1910), Dr. A. E. Shipley records five species of pentastomids from various Indian and African reptiles, including a new species of Porocephalus from the tortoise *Kachuga lineata*. The most interesting fact in the paper, however, is the occurrence in the pharynx of an Indian crocodile, captured on the mouth of the river Hooghly, of *Linguatula subtriquetra*, a parasite hitherto known only from the American *Caiman sclerops*.

No. 6 of the fourth volume of the Records of the Indian Museum is devoted to a revision, by Miss G. Ricardo, of the Oriental gad-flies of the genus Tabanus. No fewer than forty new species, including one from Celebes (which the author excludes from the Oriental region) and three from other regions, are described in the monograph; on the other hand, a large number of reputed species are relegated to synonyms.

The Rugby School Natural History Society, of which we have received the report for 1910, is to be congratulated on a marked increase in the number of its members, of which the total is now 425. The activity of the various sections has been, on the whole, well maintained, while some of them have exhibited remarkable energy and enthusiasm in their work. An interesting innovation in the present report is a record of the scientific work of old members of the society.

A contribution to our knowledge of the modern reptile fauna of Africa is made by Mr. F. Siebenrock in vol. cxix., part vii., of the *Sitzber. k. Akademie der Wissenschaften*, Vienna, who describes, with four plates, a large collection of chelonians made by Messrs. Pöck and Brunnthaler in the south and south-west. Eleven species—none new—are recorded, of which *Homopus boulengeri* and *Testudo bergeri* are figured. Special attention is directed to a series of *T. oculifera*, which is regarded as of importance in connection with the evolution of the colour-pattern. In the author's opinion, this species and *T. geometrica* constitute in this respect a subgroup phylogenetically distinct from the other members of the same group.

Scales of fishes brought home by Dr. F. Hatch from the Ecca Shales, near Ladysmith, of which an account is given by Dr. Smith Woodward in part ii. of the second volume of the Annals of the Natal Museum (pp. 229–31), are of interest as affording further evidence of the existence of an abundant fauna of Palæoniscidæ in southern Africa during early Mesozoic and late Palæozoic times. Scales of the same general type have been previously obtained from the Karu formation of the Cape and the Permo-Carboniferous of Rhodesia and Nyasaland. The last-named were referred by Dr. Traquair in the Quart. Journ. Geol. Soc. for 1910 to Colobodus, while the Rhodesian and the new Natal specimens represent the genus Acrolepis, of which there may be two species.

The Times of March 27 devotes an article to the wild fauna of South Africa in connection with the forthcoming display in the Zoological Society's Gardens in Regent's Park of a representative series of South African animals, to be called the King's collection. The collection, which already includes a large number of species, is to be presented to his Majesty in commemoration alike of his Coronation and of the establishment of the Union of South Africa. According to the latest information from the

Cape, the animals are being drafted to various ports previous to their shipment for this country. It is unfortunate that a southern seal recently received at the gardens, which is to be included in the African collection, is alluded to in the article as Ross's seal (*Ommatophoca rossi*) of the Antarctic, whereas it is really, as pointed out by Mr. Pocock in *The Field* of April 1, a young specimen of the sea-elephant or elephant seal (*Macrorhinus leoninus*). It was obtained from the Crozets, and is the first living example of its kind received in the gardens, and probably in Europe. The young animal is very like Ommatophoca, having a short, blunt muzzle and very large eyes.

In an article published in *The Fortnightly Review* for April, Mr. F. G. Aflalo records his impressions of the London Zoological Gardens on paying his first visit after a three years' absence from England. His impressions are altogether satisfactory, and he especially commends the removal of the society's offices to the gardens, as the result of which the whole establishment is under the immediate eye and control of the secretary. It is added that, "as a result of this new control, we have the evidences of success on all sides, not merely in the condition and housing of the animals, but also in the higher birth-rate, lower death-rate, and increase in the number of both fellows and visitors to the gardens." Commendation is also accorded to the systematic plan on which the whole laying-out of the gardens is being remodelled, so far as existing buildings will permit, and the erection of new buildings and the construction of new enclosures with the view of a striking and picturesque general effect. Such changes must, however, of necessity be slow and gradual, as their cost is great. With its distinctly unfavourable conditions of climate and soil, the "New Zoo" cannot hope to rival in all respects similar establishments situated under sunnier skies, but, nevertheless, it "has overcome many obstacles, climatic and otherwise, and the result is something of a triumph."

The annual report for 1909 issued by the director of the Sydney Botanic Gardens and Government Domains contains a few illustrations, one of which provides a view of the Centennial Park and another illustrates a clump of trees of *Casuarina glauca* in the botanic gardens. The cultivation of succulents is receiving special attention, and an extensive planting of palms in the domain is recorded. Among the noteworthy plants under cultivation mention is made of *Beilschmiedia Tarairi*, a New Zealand silver-leaved tree, analogous to the copper beech; an Australian natural hybrid, *Brachychiton populneo-acerifolius*; and two native plants, a white-flowered composite, *Olearia Flocktoni* and *Drymophila Moorei* (Liliaceæ). The publications emanating from the department include parts of the Forest Flora and several pamphlets on useful Australian plants.

Partly for the purpose of comparison with the working of the forests of *Pinus longifolia* in the North-west Provinces of India, a description of the State pine forests of Landes and Gironde in France is contributed to *The Indian Forester* (December, 1910). The area of sand dune converted into forest amounts to 200,000 acres, and, in addition, there is a littoral dune and protective wooded belt of one quarter of that area. The dunes are controlled by fascines and plantations of marram grass. *Pinus maritima* is grown as a pure crop for timber and resin under a rotation varying from sixty to seventy-five years. The species seeds freely from about an age of twelve years. Tapping for resin begins on trees about thirty-five years old, and proceeds until the tree is cut down. Details of tapping, the instruments used, and distillation are given.

In plant hybrids raised by crossing *Œnothera biennis* and *Œ. muricata*, Prof. H. de Vries has observed some distinct features, which are indicated in a preliminary paper published in the *Biologisches Centralblatt* (February 15). In the first instance, the reciprocal hybrids *bm*, *mb*, are distinct from each other and from their parents, although clearly resembling the parent from which pollen was taken. The two resulting hybrids were then reciprocally crossed, *bm* × *mb*, *mb* × *bm*, when the former lost all traces of the species *muricata* and the latter all traces of *biennis*. The conclusions are formulated that for these two species the pollen cells bear special characters not shared by the egg cells, and that the characters of the grandfather cannot be transmitted through the mother nor those of the grandmother through the father. Similar results, *i.e.* dominance of the male parent and elimination of the characters of the female parent, were obtained when either of these species was crossed with allied species.

It may not be generally known that the annual lists of "Geological Literature added to the Geological Society's Library" (Burlington House, London) can be purchased by the public. The issue for 1910 includes books and papers received up to December 31 in 1909, and the subject-index enables a reader to refer to the geological work of the whole year under almost any heading that may be in his mind. We see, for instance, that eighteen authors have written on Colorado, ten on laterites, and five on Natica. The list is especially important as an index to the geological journals of the world.

Mr. P. Macnair has prepared an "Introduction to the Study of Rocks" as a guide to the rock-collections in Kelvingrove Museum, Glasgow (1911, price 3*d.*). It is well illustrated by photographs of rocks in the field, in hand-specimens, and in thin slices. The rock-forming minerals are also described, with figures of characteristic forms. Objection may be taken to the description of quartz and calcite as hexagonal, and to ilmenite as a "ferriferous titanite"; but the notices of the minerals and rocks are clear and adequate. Numerous drawings of sections of Scottish rocks are included in the text, and the book is distinctly attractive as an introduction to petrography.

For the benefit of teachers of geography in the State, a series of chapters dealing with the geography of Ohio State, by Mr. F. Carney, are appearing in the Bulletin of Denison University. Those treating of transport, glaciation, and the economic mineral products, provide useful summaries of information relating especially to Ohio.

Prof. Huntington, in the February number of the Bulletin of the American Geographical Society, describes the Karst country of southern Asia Minor, where to the south and west of Konia many of the streams end in dark, deep pools, in which the water sinks slowly underground. Much of the country, and especially the great plain of Axylon to the east of Konia, is too dry to be fruitful unless artificially supplied with water. Considerable work is being done whereby the waters of lake Bey Shehir (Kirili Göl) will be diverted, by means of a canal, from the lower lake of Kara Viren, where much is now lost, and will be carried through the Charsbembeh gorge to the plain below, where it is expected to put about 350 square miles under irrigation when the canal is opened by the end of 1912.

In the *Revue générale des Sciences* for March 15, M. F. Diénert discusses the report of the commission which has investigated the floods of the Seine valley in 1910, and made recommendations to mitigate the disastrous effects of future ones. The predictions of the Hydrometric Service were, on the whole, very correct, but the coincidence of flood waves in different tributaries, and the reduction of the effective channel by bridge piers, quays, and floating structures resulted in widespread inundation of the city. Three works were recommended by the commission, each of which would entail considerable outlay, but one at least, to take a branch from the river Marne by Claye to Epinay, would be of considerable economic value also. The other projects, to widen the left branch of the Seine and to deepen it between Suresnes and Bongival, will also receive a further study.

The meteorologist of the Commonwealth of Australia has published his annual rain map of Australia for the year 1910, in which he shows that the coast lands in the south-west, almost the whole of the State of South Australia, or the States of South Australia and Queensland, northern New South Wales, and eastern Victoria received a rainfall above the average in 1910. This was especially so in the northern territory of South Australia, where the heavy fall was due to the activity of the monsoon rain influences. The difference between the actual fall in 1910 and the normal in some cases is very striking, showing frequently an increase of 50 per cent. The lowest rainfall, under 5 inches, was in central Western Australia. The highest, about 180 inches, was on the coast of Queensland half-way between Cook Town and Townsville. The district near Zeehan (Tas.) received above 100 inches.

"The Supposed Cold of Winter Anticyclones" is the title of a useful note by Mr. W. H. Dines in *Symons's Meteorological Magazine* for March. In an interesting summary of the weather of January, in the magazine of the previous month, reference was made to the striking exception to the old dogma that high barometric pressure in winter is almost invariably associated with persistent frost. Mr. Dines, who some years ago assailed that idea in the Quarterly Journal of the Royal Meteorological Society, now points out, *inter alia*, that during the 50 years 1841–90, the Greenwich records show 74 periods of frost. Out of these, 20 (with 216 days of frost) occurred with the mean of the barometer below 29·80 inches, and 13 (giving 93 days) with a mean above 30·20 inches. Every frost noted for severity or length had occurred in the low-pressure series. Also at Christiania, Berlin, and Geneva no connection between the monthly winter means of the height of the barometer and of the temperature is shown. The statement in question is still made in some text-books, and may possibly be true in drier countries, *e.g.* in Asia and North America. Kite and balloon observations have shown that the air a few thousand feet high during an anticyclone is unduly warm.

The climatology of 1910 is discussed in the usual annual summary which MM. Flammarion and Loisel contribute to the February number of *L'Astronomie*. The discussion is based on the daily observations made at the Juvisy Observatory, and the different results, in addition to being plotted all on one chart, are compared with the analogous monthly, seasonal, and yearly results registered during the past twenty-five years. The year 1910 was almost entirely a bad one from the weather point of view. An abnormally low barometer, which beat the minimum record for December, was accompanied by excessive humidity and rainfall, the number of rainy days (212) exceeding that of any year since 1893, while the amount of rain was 818·4 mm., or 275·9 mm. above the annual mean; its partition among the seasons was also abnormal. Although the mean temperature was the highest since 1906, the spring and summer were deficient in sunshine, there being 1555 hours spread over the 301 days on which sunshine was recorded; in 1909, 1970 hours were recorded for 300 days. In consequence of this state of sunless, cold humidity, the vine, wheat, and other crops met with disaster, and, as a "comet" year, 1910 compared very unfavourably with the legendary years 1811 and 1858.

An abstract of the first three of the lectures on "Radiant Energy and Matter," which Sir J. J. Thomson is delivering at the Royal Institution, will be found in *The Electrician* for March 24. The first lecture dealt with the measurement of radiant energy and the laws which have been found to connect the energy radiated with the temperature of the radiating body. The second dealt with the pressure which radiation exerts on the body on which it falls, and the applications of the results of experimental and theoretical work on this subject to cosmical problems. The third dealt with the visible radiations, their production by fire-flies and by illuminating engineers, and their perception by the human eye.

In the March number of *Terrestrial Magnetism and Atmospheric Electricity*, Mr. J. A. Fleming, of the department of terrestrial magnetism of the Carnegie Institution, describes two new types of magnetometer which have been constructed for land observations in districts more or less difficult of access. The first is a theodolite magnetometer for astronomical work and the determination of declination and horizontal force, the second is a universal instrument for astronomical work, declination, horizontal force, dip, and by Lloyd's method total intensity. In both cases the magnet system consists of a long and a short magnet each embedded in a brass cylinder of a standard size. The suspension is of phosphor bronze strip. The first instrument is built on the usual lines, but the reduction of size has necessitated changes of details. The second departs considerably from the traditional form owing to the combination of a dip circle with the deflection magnetometer. The two instruments, packed in their cases, weigh 11 and 13 kilograms respectively, and the degree of accuracy obtained by means of them is about the same as that secured with the older and much heavier instruments.

Messrs. Adam Hilger, Ltd., have sent us a copy of their new general catalogue, which should be in the hands of every worker in the ever-widening field of spectroscopic research. Not only are a large number of spectrographs figured and described, their special features and adaptability for various purposes are carefully explained, so that the book is something more than a mere catalogue. One of the many features to which the firm pay special attention is the quartz-spectrograph, with which we know excellent results have been obtained. These are now made in a large variety of forms, some of which are easily convertible, so that their action can be modified to suit the special end in view. An ultra-violet stellar spectrograph, giving a spectrum 50 mm. in length from λ 3000 to λ 8000, is quoted at 53*l*., and with its large angular aperture should prove a very effective instrument. A wedge spectrograph for technical use, designed by Dr. Mees for the rapid and permanent recording of absorption, transmission, and sensitivity curves, is sold, with the necessary accessories, at 17*l*. The catalogue also contains figures and descriptions of many accessories—gratings, slits, tubes, &c.—and of several special pieces of apparatus, such as the echelon, the Fabry and Perot interferometer, &c. Those workers wishing to learn more of the latest forms of these special apparatuses should get section B of the catalogue, issued separately, in which, in addition to the descriptions, figures, and prices, complete bibliographies concerning them are given.

We have received the new edition of the "Descriptive List of Photographic Dry Plates, Filters, and Safelight Screens" manufactured by Messrs. Wratten and Wainwright, Ltd. (Croydon). The firm have recently installed apparatus for the critical examination of the effect of colour screens upon definition, a matter too often left to chance. With regard to the plates, &c., prepared specially for all kinds of scientific work, we notice specific statements as to those best adapted for photographing various parts of the spectrum, and the "high resolution plates," for which a "limiting separation of about 1/150th mm." is claimed, as against a separating power equal to about 1/40th mm. for ordinary plates. These special plates are slow panchromatic plates.

OUR ASTRONOMICAL COLUMN.

Detonating Meteor in Messina.—On Monday evening, April 10, at 7 p.m., people at Messina noticed a brilliant illumination of the sky, succeeded in about three minutes by four loud explosions like artillery discharges. The idea was that one of the ammunition magazines in a fort had exploded, but telegraphic despatches from Palermo, Catania, and Reggio di Calabria announce that a similar phenomenon had been remarked there, and that it had its derivation from a large bolide or some other meteoric disturbance. The interval of three minutes between the flash and sounds show that the disruption of the fireball occurred at a distance of about forty miles from the observer at Messina. More information is awaited. At other stations the object may have approached much nearer, if it did not, indeed, shower some of its disintegrated fragments to the ground. April 10 is a rather special date for large fireballs; it has furnished many fine specimens in past years.

Halley's Comet.—Writing to the *Astronomische Nachrichten* (No. 4489), M. Antoniadi shows that whilst Prof. Eginitis recorded the tail of Halley's comet as being directed towards the sun at 6h. 40m. (G.M.T.) on May 20, 1910, five observers who saw it at various short intervals before that time, and five who saw it after, recorded the tail as directed from the sun; only twenty-nine minutes separated the times of observation at Sonnwendstein and Athens, the former being 7h. 9m. (G.M.T.). Mr. Evershed, observing at Kodaikánal about 2h. (G.M.T.) on May 20, saw no trace of a tail directed towards the sun, although he looked specially for it.

The same number of the *Astronomische Nachrichten* contains a long series of observations of the comet made at Besançon (December 10, 1909, to June 29, 1910) and at Berlin (December 16 to June 10); M. Chofardet reproduces a drawing showing the magnificent fan which preceded the sharp nucleus on May 27.

Circulation in the Solar Atmosphere.—From an examination of 3323 prominences shown on photographs taken between January, 1904, and December, 1910, with the Rumford spectroheliograph at the Yerkes Observatory, Dr. Slocum has derived some valuable data concerning the circulatory currents in the solar chromosphere; the light of the H calcium line was always employed. Of the total examined, 1094 prominences, either by their shapes or movements, indicate a horizontal current, and as the average height to which these extended was 0·7′, or 30,000 km., the results represent the average poleward components of the solar atmospheric circulation from the lower surface of the chromosphere up to that height. Dr. Slocum finds that in middle latitudes there is a tendency for movement towards the poles, and in high latitudes a tendency towards the equator; near the equator the motion is practically negligible. The contrast between the two tendencies is greater in the northern hemisphere in the ratio of at least 2 : 1.

Among the earlier plates there were few which afforded data from which the velocities of the motions could be determined, but during the past year suitable plates for this purpose have been taken regularly. There is some difficulty in determining which of the observed movements may be ascribed to systematic circulation and which to local explosive outbursts, but ten selected cases give velocities of from 0·5 km. to 10 km. per second for the component of the circulatory movement which is perpendicular to the line of sight; one detached cloud, floating at an elevation of 442″, or 320,000 km., showed a velocity of 50 km. per second. Dr. Slocum points out that these results are not necessarily a contradiction to those obtained by Dr. St. John, who failed to detect any currents of appreciable velocity parallel to the solar surface; the two researches deal with different levels in the solar atmosphere. He further suggests that as his results depict the movements at an average height of 30,000 km., they probably apply to an upper current analogous to terrestrial anti-trades; a later discussion to deal with the different levels is promised (*Astrophysical Journal*, vol. xxxiii., No. 2, p. 108).

The Popularisation of Astronomy.—From *The Yorkshire Weekly Post* for April 8 we learn that the excellent idea of out-of-door astronomical talks has also been suggested by Mr. J. H. Elgie as a useful item in the programme of the Leeds Astronomical Society. For the past three weeks the society has been waiting, in vain, for a favourable sky so that they might hold the proposed Saturday evening meeting. Such meetings, open to the public, might easily be organised, and would probably do a great deal to dissipate the lamentable ignorance concerning the stars which is so frequently displayed by the general public.

The Antwerp Astronomical Society.—Among the many interesting matters recorded in the sixth annual report (1910) of the Antwerp Astronomical Society, it is of interest to learn that the society's observatory is being very generally used by a large number of students in the local schools, who, under the guidance of their tutors, visit the observatory and have the equipment, &c., explained to them. A new communal observatory is to be placed on the top of a school which is in course of erection in the city. An analysis of the observing weather during 1910, made by M. Felix de Roy, is also of interest. Of the 365 days in 1910, observations of the sun were possible on 269 days, and night observations were possible on 142; for 1909 the figures were 292 and 151; in 1908 there were 156 good nights; in 1907, 145; and in 1906, 102.

Spectroscopic Binaries.—The Journal of the Royal Astronomical Society (Canada, vol. iv., No. 6) contains the orbits of the spectroscopic binaries 93 Leonis and ε Ursæ Minoris as determined by Messrs. J. B. Cannon and J. S. Plaskett, respectively, from plates taken at the Dominion Observatory, Ottawa.

Mr. Cannon made two determinations, using micrometer measures in the first and the comparator in the second, and, judging from the probable errors of an average plate, there is but little difference between the two methods; fainter spectra may be measured with the micrometer than in the comparator, but with poor lines for measurement the latter instrument probably affords a better agreement among the measures. The period of 93 Leonis is found to be 71·7 days, and the eccentricity of the orbit is very small.

For ε Ursæ Minoris Mr. Plaskett finds a period of 39·482 days, a range of velocities of 63 km. per sec., and a small eccentricity; the velocity of the system is −11·398 km. per sec.

EXPERIMENTS WITH COAL DUST IN FRENCH COLLIERIES.

Soon after the dangers due to the presence of coal dust began to be realised in this country, and, as a consequence, regulations regarding the composition and methods of employing explosives in dusty mines had been added to the Statute-book, the number of great explosions occurring within a given time underwent such a remarkable diminution that for several years it seemed almost as if they were about to cease altogether. But a partial